

How a structural board thermal floor system is shaking up the housebuilding industry

It is estimated that 75% of all new houses are built using a thermal floor system with 25% still using in-situ slab. Bridget Bouch of Jablite explains why Davidsons Homes made the change.

Davidsons Homes, a luxury housing developer covering the East and South Midlands areas, specialises in building high-spec homes that fit in with natural surroundings and the local area of a development. The company ensures that a high level of detail is taken into consideration during construction, which also extends to fittings inside its properties.

The firm has overhauled the way it constructs flooring systems on its developments. It had previously installed reinforced suspended concrete slabs to all plots.

As a general note, the ground conditions will dictate the type of floor construction to be installed.

The Jablite structural board thermal floor system was trialled on a new site in Bardon early 2018. The majority of new sites are now using a beam-and-block thermal floor system.

There were a number of reasons for the decision to switch to this type of system. The key benefits are that it is much faster and easier to install, it is manufactured off-site and deliveries to site are significantly reduced, in particular ready-mixed concrete and stone.

The system also reduces health and safety

risks, and reduces carbon emissions from vehicles. Another benefit is that there is less small plant on-site, as the expanded polystyrene (EPS) can be moved by hand and no disc cutters are needed for cutting.

Benefit

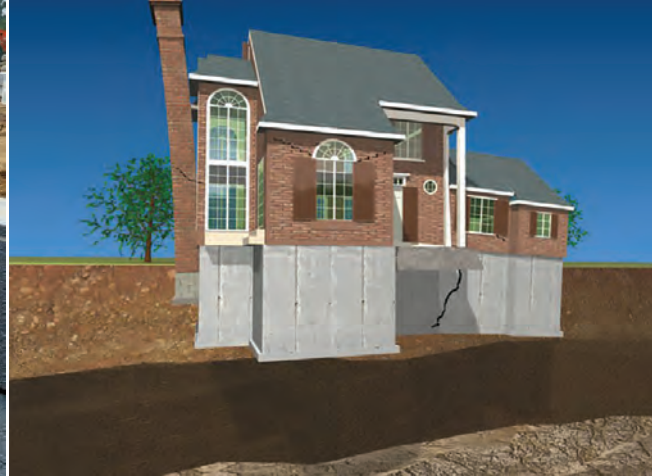
The structural board thermal floor system simplifies the overall building process. The suspended reinforced concrete slab in some cases had different thicknesses with different grades of reinforcement that had to be kept on-site. Materials still have to be stored on-site, but it is a lot less and easier to control. If a service position is repositioned the screed can be easily cut and made good where previously it was difficult to break up the floor and repair.

The structural board system is designed to replace the traditional beam-and-block floor. It is faster to install while achieving Part L 2013 compliance. The insulation is supplied in EPS or high performance to provide the required performance and is 100% recyclable, with cut-offs being made into further insulation boards. The system combines prestressed concrete beams with EPS panels installed between the beams and a structural board on top. The floor is finished with

Above: Finished Davidsons housing.



Lower Bardon – foundations, plot one.



The damage that ground heave can cause.

a structural concrete topping mixed with macro-fibres.

The structural board thermal floor system has enabled Davidsons Homes to have greater control over its costs as some materials, including steel, have fluctuating prices. Overall, the company estimates that the new system saves a week in the build programme for each site.

Typically, two or three plots are made ready for the structural concrete topping, the concrete is delivered and placed, then ground workers move on to the next batch of plots.

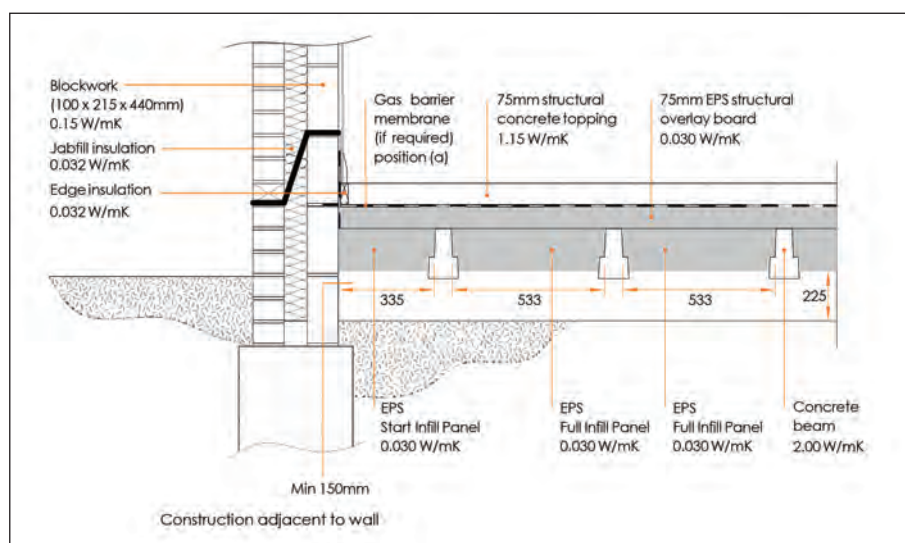
There is less risk using the structural board thermal floor system than suspended slab as there isn't the volume of ready-mixed concrete required. Sites were previously dependent on a concrete mixer truck turning up on time. If site had to cancel because of weather, the business would potentially incur a cost.

“Before, we were using a combination of

80% suspended slab and 20% beam-and-block suspended floors across sites. We started looking at alternatives and it quickly became apparent that the thermal floor system is much quicker and easier to install,” says Alex Playfair, Davidsons group design manager.

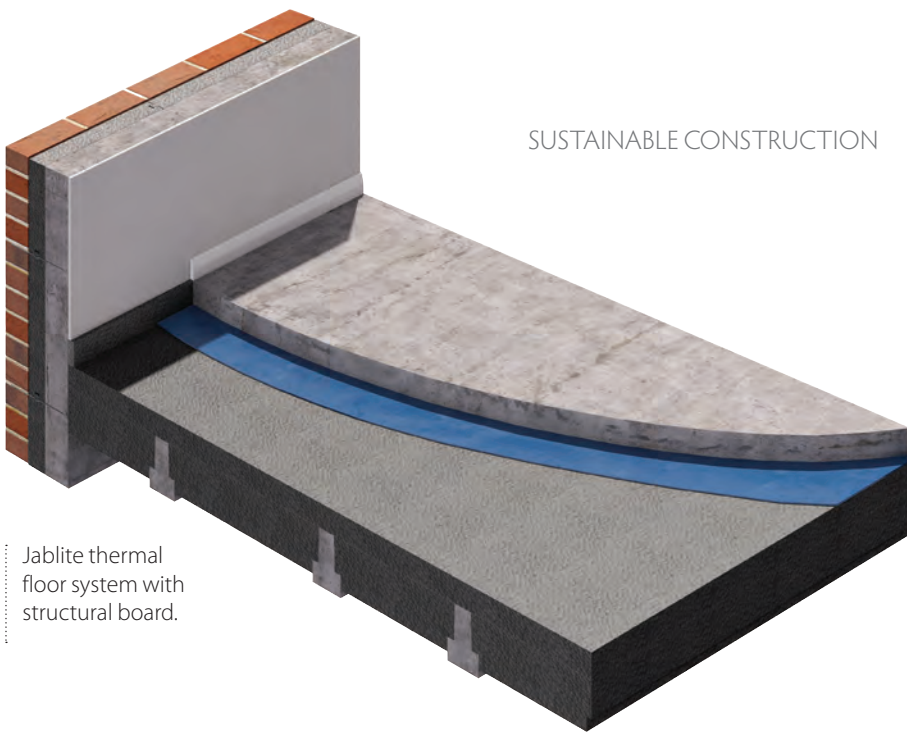
“The system also reduces health and safety risks and reduces carbon emissions from vehicles. Another benefit is that there is less small plant on-site, as the expanded polystyrene (EPS) can be moved by hand and no disc cutters are needed for cutting.”

“We trialled the thermal floor system on our site in Lower Bardon,” adds Playfair. “The floors can be installed in any weather and the lightweight EPS panels can be



Structural board cross-section.

SUSTAINABLE CONSTRUCTION



Jablite thermal floor system with structural board.

handled manually. Even though the thermal floor system is slightly more expensive, we made the decision to change because the time-efficiency more than made up for the extra cost. We have changed 100% over to concrete beam and EPS thermal floors on all our sites," he says.

GRM Development Solutions, a specialist geotechnical, environmental and structural consultancy work for Davidsons, notes that the change from in-situ slab to the thermal floor system has benefited the housebuilder in a number of ways.

Patrick Rowlandson-Gray explains, "We do the ground investigation, as well as design the foundations on Davidsons Homes sites; this helps with planning as we can give them an early indication of what to expect on the site. Jablite does the floor designs for the specific house going on each plot. Then we will design the foundations depending on the ground condition and the loadings required.

"The new system has taken away the need for some of the traditional trench fill foundations that were needed for the slab. This speeds up the construction and reduces the concrete cost." ■

Structural board thermal floor system installation on-site.



Ground heave protection installed on-site in Harrow.

Ground heave protection

Expanded polystyrene is engineered to protect concrete slab and beam from damage by upward ground pressure.

Ground heave occurs when clay soils expand, swell and move upwards due to excessive moisture, causing movement of the upper surface of the soil. Ground heave is the opposite of subsidence, in which soil becomes unstable and sinks, moving downwards.

When ground heave occurs, soil moves upwards, as it cannot expand sideways or downwards. Ground heave can cause clay soils to move up to 150mm, causing severe damage to building foundations and structural integrity.

Causes of ground heave include clay soils and removal of (or dead/dying) trees, as tree roots can no longer absorb water from the soil, causing water to build up in the ground. Other causes are excavation methods, a change in the level of the water table, nearby building works, broken drains and seasonal weather changes. Signs in a property that ground heave is occurring include vertical cracks in brickwork and window/door frames, and raising of pavement/patio slabs.

Jablite Ground Heave Protection (JGHP) is an effective ground heave solution that comprises a cellular compressible base that is formed of 16 EPS boards that have been designed and produced to create interlocking strips that join together, creating a durable cellular structure.

Manufactured from EPS with a polypropylene top and bottom sheet, JGHP is easy to cut on-site to required specifications:

- Clay heave problems can be resolved without specialised equipment.
- Can withstand conditions below the surface of the ground and cope with high levels of ground water without degrading.
- According to NHBC Standards, low-density compressible polystyrene can successfully alleviate pressures placed upon concrete beam-and-slab foundations in soils that are prone to shrinkage.